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## [54] SYSTEM FOR DISTRIBUTING VIDEO/AUDIO FILES FROM CENTRAL LOCATION TO A PLURALITY OF CABLE HEADENDS

[75] Inventors: William P. Dawson, Murray, Utah; Jay B. Schiller, Boulder, Colo.; Richard A. Schmelzer, Boulder, Colo.; Daniel J. Zigmund, Boulder, Colo.

[73] Assignee: Cable Services Technologies, Inc., Boulder, Colo.

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## [56] References Cited

## U.S. PATENT DOCUMENTS

4,334,306	6/1982	Ulug .....	370/94
4,422,171	12/1983	Wortley et al. .	
4,763,191	8/1988	Gordon et al. .	
4,829,372	5/1989	McCalley et al. .	
4,829,569	5/1989	Seth-Smith et al. ....	348/6
4,841,526	6/1989	Wilson et al. .	
4,888,767	12/1989	Furuya et al. .	
4,908,828	3/1990	Tikalsky .	
4,920,432	4/1990	Eggers et al. .	
4,939,731	7/1990	Reed et al. .	
5,014,125	5/1991	Pocock et al. .	
5,151,782	9/1992	Ferraro .	
5,161,194	11/1992	Ujiie .....	455/12.1
5,172,413	12/1992	Bradley et al. .	
5,191,410	3/1993	McCalley et al. .	
5,216,515	6/1993	Steele et al. ....	348/6
5,220,420	6/1993	Hoarty et al. .	
5,247,347	9/1993	Litteral et al. .	
5,247,575	9/1993	Sprague et al. .	
5,253,275	10/1993	Yurt et al. .	

5,262,875	11/1993	Mincer et al. .	
5,283,639	2/1994	Esch et al. ....	348/6
5,285,272	2/1994	Bradley et al. .	
5,301,194	4/1994	Seta .	
5,303,234	4/1994	Kou .....	370/85.2
5,345,594	9/1994	Tsuda .....	348/6
5,412,660	5/1995	Chen et al. ....	455/12.1
5,430,738	7/1995	Tsuda .....	371/32
5,440,336	8/1995	Buhro et al. ....	348/7
5,446,490	8/1995	Blahut et al. ....	348/7
5,481,546	1/1996	Dinkins .....	348/13
5,499,046	3/1996	Schiller et al. ....	348/6

## FOREIGN PATENT DOCUMENTS

4308161	9/1994	Germany .....	455/12.1
97248	6/1982	Japan .....	H04L 1/00
293020	11/1989	Japan .....	455/12.1
240926	8/1992	Japan .....	455/12.1

Primary Examiner—John K. Peng

Assistant Examiner—Chris Grant

Attorney, Agent, or Firm—Myers Liniak &amp; Berenato

## [57] ABSTRACT

A system and method for ensuring accurate reception of digitally encoded files that are transmitted in non-real time from a distribution station to a plurality of receiving stations, e.g. cable headends. Each file is divided into a plurality of data packets, with the packets being transmitted via satellite to the headends. Each headend determines which packets are in error (i.e. missing or jumbled) and need to be re-transmitted to the headend from the distribution station. After such a determination, each headend communicates a request over a land-link, e.g. telephone line or internet, to the distribution station requesting re-transmission of the packets in error. The distribution station then re-transmits these particular packets either via the land-link or the satellite. Re-transmission in non-real time via the land-link allows the headend to simultaneously receive packets via satellite and land-link so as to reduce the time taken to transmit files from the distribution station to the headends. The different land-links coupling the distribution station to each receiving station allow different data packets to simultaneously be re-transmitted to different receiving stations.

17 Claims, 6 Drawing Sheets

